

# Preliminary Information Memorandum

September 2016



Walney Extension

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## Glossary of definitions

Item	DEFINITION
Asset Transfer Date	The date on which the WOW Ext Transmission Assets are transferred from the Developer to the OFTO
BAFO	Best and Final Offer
Cable route length	The installed length of the cable
Cable length	Cable length cited in applicable contract
CIGRE	Conseil International des Grands Réseaux Electriques
CPA	Coastal Protection Act 1949
CRA	Cable Risk Assessment
DECC	Department of Energy and Climate Change
Developer	Walney Extension (UK) Limited
DONG Energy	DONG Energy A/S and its affiliates
DTS	Distributed Temperature Sensing
EPQ	Enhanced Pre-Qualification
FAT	Factory Acceptance Test
FEED	Front End Engineering and Design
FTV	Final Transfer Value
GB	Great Britain
GIS	Gas Insulated Switchgear
GW	Gigawatt
HDD	Horizontal Directional Drilling
HV	High Voltage
IEC	International Electrotechnical Commission
ITT	Invitation to Tender
ITV	Indicative Transfer Value
km	Kilometre
kN	Kilo Newton
kV	Kilovolts
LAT	Lowest Astronomical Tide
Ltd	Limited company
MVA	Megavolt Ampere

MW	Megawatt
NETS	National Electricity Transmission System
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standards
NETSO	The National Electricity Transmission System Operator is the entity responsible for coordinating and directing the flow of electricity over the National Electricity Transmission System
NETSO Licence	The electricity transmission licence granted, or treated as granted, pursuant to section 6(1)(b) of the Electricity Act 1989 and in which section C of the standard transmission licence conditions applies
NGET	National Grid Electricity Transmission plc. NGET owns and maintains the transmission system in England and Wales. It is also the NETSO for GB.
O&M	Operation and Maintenance
Offshore Boundary Point	The point at which, with effect from the Asset Transfer Date, the Developer's assets will connect to the Walney extension Transmission Assets
Ofgem	The Office of Gas and Electricity Markets
OFTO or Offshore Transmission Owner	The holder of the Offshore Transmission Licence for Walney Extension
Onshore Boundary Point	The point at which the Walney Extension Transmission Assets will connect to the NETS
ONSS	Onshore Substation
OSS	Offshore Substation including topside module and jacket substructure including piles together with HV, MV and LV components and systems, mechanical and electrical services
OWF	Offshore Wind Farm
PB	Preferred Bidder
PIM	Preliminary Information Memorandum
PQ	Pre-Qualification
RPI	The UK Retail Price Index
S&I	Supply and Install
SB	Successful Bidder
SCADA	Supervisory Control and Data Acquisition
SPA	Sale and Purchase Agreement
SPV	Special Purpose Vehicle
SVC	Static VAR Compensator
TCPA	Town and Country Planning Act 1996
TO	Transmission Owner
TOC	Taking-Over Certificate

Transmission Licence	The licence awarded under section 6(1)(b) of the Electricity Act 1989 authorising the NETSO or a TO to participate in the transmission of electricity including an Offshore Transmission Licence. The licence sets out a TO's rights and obligations as a transmission asset owner and operator.
Transmission Licensee	The holder of a Transmission Licence
TR5	Tender Round Five
UK	United Kingdom of Great Britain and Northern Ireland
UPS	Uninterrupted Power Supply
VAR	Volt-ampere reactive
WOW03	Walney Extension Offshore Wind Farm 03
WOW04	Walney Extension Offshore Wind Farm 04
WOW03 and 04	The offshore wind farm known as Walney Extension located approximately 35km NW of the Fleetwood/Blackpool coast in the UK
WOW03 and 04 Transmission Assets	The assets of the transmission system of the WOW03 and 04 Offshore Wind Farms as outlined in Table 1 of this Preliminary Information Memorandum
WTG	Wind Turbine Generator
XLPE	Cross-Linked Polyethylene
€/MWh	Euro per Megawatt hour

## 1. Investment Highlights

### 1.1 Attractive Wind Farm Development

The Walney Extension ("**WOW 03 and 04**") Offshore Wind Farm will be located to the NW of the existing Walney Offshore Wind Farm 1 & 2, around 19km WSW off the Isle of Walney coast in Cumbria, 26km SW of the Millom coast, 35km NW of the Fleetwood and Blackpool coast, and 31km SE of the Isle of Man. National Grid Electricity Transmission plc ("**NGET**") is the onshore transmission licensee, and the WOW03 and WOW04 Transmission Assets will connect to the Middleton 400kV substation located at Heysham.

WOW03 consists of 40 V164-8.0MW turbines from MHI Vestas. The installed capacity for WOW03 is 330MW (324MW at the offshore boundary point), utilising a power mode feature to be able to deliver 8.25MW per turbine. WOW04 will consist of 47 7.0MW 154 Siemens turbines, with an installed capacity of 329MW (324MW at the offshore boundary point).<sup>1</sup> Each wind farm will be connected to an offshore substation ("**OSS**") located within the boundaries of the WOW03 and 04 Offshore Wind Farm. Both OSSs are connected to an onshore substation connecting to the 400kV NGET Middleton substation.

The WOW03 and 04 Transmission Assets are currently under construction and due to be fully operational and commissioned by the end of Q2 2018. They will include an onshore substation, two OSSs, two export cables (subsea and land), one interlink cable (subsea)

<sup>1</sup>The difference between installed and connected capacity is attributed to WTG transformer and array cable losses. National Grid Electricity Transmission plc ("**NGET**") has agreed a figure of 630MW which can be exported at the onshore boundary point (Transmission interface point) – TIP.

and an Offshore Transmission Operator ("**OFTO**") dedicated Supervisory Control and Data Acquisition System ("**SCADA**") system.

The WOW03 and 04 Transmission Assets are expected to deliver an availability of 98%, taking into account both planned and unplanned maintenance.

### 1.2 Highly Experienced Project Developer

The participating company in the WOW03 and 04 Offshore Wind Farm is DONG Energy Walney Extension (UK) Limited (the "**Developer**"), which is a wholly-owned indirect subsidiary of DONG Energy A/S (together with its affiliates, "**DONG Energy**").

DONG Energy is highly experienced in the offshore wind sector, bringing a track record which demonstrates a capacity and ability to design, construct and operate the WOW03 and 04 Offshore Wind Farm alongside other similar scale projects in its pipeline.

DONG Energy has established itself as a market leader in the UK and European offshore wind power sector, where the company has been engaged in developing, planning and constructing some of the largest offshore wind farms in operation worldwide. In the UK its major offshore wind farms include Barrow, Gunfleet Sands, Walney 01, Walney 02, London Array, West of Duddon Sands, Westermost Rough and most recently Burbo Bank Extension.

DONG Energy has successfully participated in eight OFTO transactions with assets totaling approximately 2.1GW<sup>2</sup> of installed transmission capacity, with the total transfer value of these assets being approximately £1.5bn<sup>3</sup>.

### 1.3 Mature and Attractive Regulatory Environment

The independent ownership and operation of offshore transmission in the UK enjoys strong political, regulatory and stakeholder support in the UK. The regime was developed by the Department of Energy and Climate Change ("**DECC**") and Ofgem over several years. Both have consulted widely and regularly on the relevant stage of the development of the regime and have taken account of respondents' views where applicable. The tender round for the WOW03 and 04 transmission assets will be Ofgem's fifth, and its third round of enduring tenders following the implementation and finalization of the OFTO tender regime. In total 15<sup>4</sup> projects have been divested to date under both the transitional and enduring OFTO regimes in tender rounds 1-3. This represents a total installed capacity of approximately 4.1GW<sup>5</sup> and a total transfer value in the order of £2.7bn<sup>6</sup> which has been successfully divested to independent transmission owners.

### 1.4 Financial Highlights

The WOW03 and 04 Transmission license that will be granted to the successful bidder for the WOW03 and 04 Transmission Assets will include the right to a 20-year revenue stream in return for purchasing the WOW03 and 04 Transmission Assets and operating them in accordance with the obligations of the Transmission License.

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<sup>2</sup> Ofgem website, June 2016

<sup>3</sup> Ofgem website, June 2016

<sup>4</sup> Ofgem website, June 2016

<sup>5</sup> Ofgem website, June 2016

<sup>6</sup> Ofgem website, June 2016

The 20-year revenue stream bid of the successful bidder for the Walney Extension Transmission Assets will be incorporated into the WOW03 and 04 Transmission License and will be fixed, subject to agreed adjustment mechanisms including indexing for inflation.

The revenue stream will be availability-based, with the opportunity to earn additional revenues for better than expected operational performance. The revenue stream will not be subject to periodic review, provided operational performance remains above the relevant minimum standard.

The revenue stream will also not be exposed to any revenue or performance shortfalls from the WOW03 and 04 Offshore Wind Farm itself. If the WOW03 and 04 Offshore Wind Farm ceases to operate, the National Electricity Transmission System Operator's ("NETSO") obligation to pay the revenue stream will continue.

## 2. Initial Transfer Value

This document is a summary of information provided by the Developer and outlines specifically the opportunity for investors to acquire the transmission assets and to become the licensed OFTO of the WOW03 and 04 Wind Farms.

It is currently estimated that a "Preferred Bidder" for WOW03 and 04 will be appointed in February 2018. This is following first generation from the WOW03 Wind Farm scheduled for August 2017 and WOW04 wind farm scheduled for January 2018. The WOW03 Wind Farm is due to be fully operational by April 2018 with the WOW04 Wind Farm fully operational by October 2018. Once completed, the WOW03 and 04 Transmission Assets will be commissioned and transferred to the OFTO identified as the successful bidder through the tender process via a transfer agreement. Asset transfer is currently anticipated to be approximately six months after appointment of the Preferred Bidder.

The costs of developing and constructing the Transmission Assets, estimated on the basis of information provided to Ofgem to date by the project developers, are £517.0 million (the "**Initial Transfer Value**"). For the purpose of the Enhanced Pre-Qualification ("**EPQ**") stage of the tender process, bidders should assume this value.

Ofgem is in the process of reviewing this information and expects to provide an estimate of the economic and efficient costs incurred in connection with developing and constructing the transmission assets at the Invitation to Tender ("**ITT**") stage (the "**Indicative Transfer Value**").

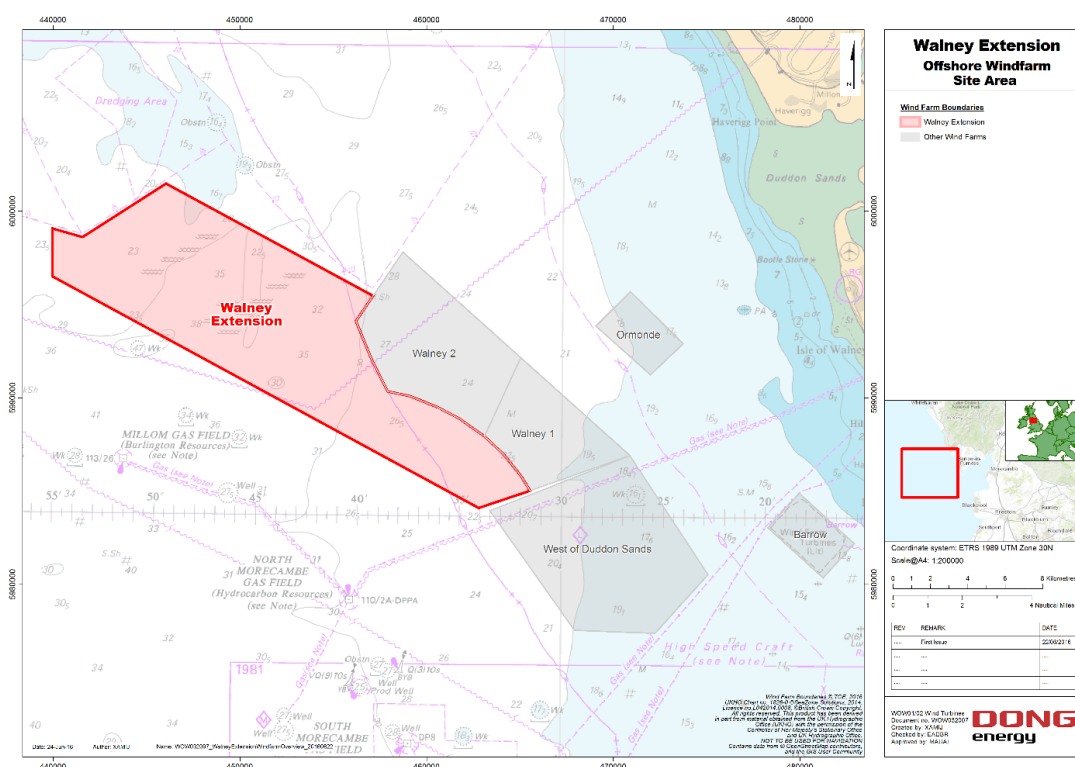
Ofgem will calculate the economic and efficient costs which have been, or ought to have been, incurred in connection with developing and constructing the transmission assets once the assets have been completed. This assessment will be used to determine the Final Transfer Value ("**FTV**").

### 3. Investment Opportunity

#### 3.1 Location of the Wind Farm Assets

The WOW03 and 04 Offshore Wind Farm will be located to the NW of the existing Walney Wind Farm 1 & 2, around 19km WSW off the Isle of Walney coast in Cumbria, 26km SW of the Millom coast, 35km NW of the Fleetwood and Blackpool coast, and 31km SE of the Isle of Man.

Wind farms in close proximity to the site include the existing DONG Energy wind farms Walney 01 and Walney 02, and West of Duddon Sands. Closer to shore are the Round 1 projects Barrow and Ormonde.



Source: DONG Energy June 2016

Figure 1. Location of WOW03 and 04 Offshore Wind Farm

The WOW03 and 04 onshore substation will be located 1.2km from shore at Walney Extension Onshore Substation, A683 Road, Middleton, Heysham, Lancashire, LA3 3QP adjacent to the existing NGET Middleton 400kV substation, which feeds directly into the existing 400kV GB national electricity transmission system.

The offshore export cables will be routed from the OSS to landfall at Middleton Sands beach near Heysham on the Lancashire coast. Two 400kV Cable grid connections will also be installed between the WOW03 and 04 Substation at Middleton and the new National Grid Middleton 400kV Substation.

Location, offshore and onshore export cable, interlink cable route and onshore substation maps can be found in Appendix 2, 3, 4, 5 & 6.

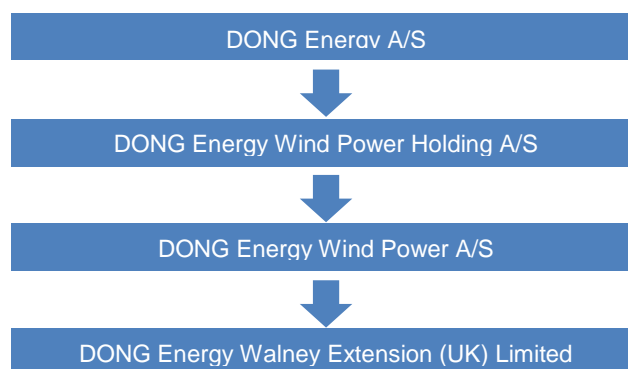


### 3.2 Ownership and Sponsors

DONG Energy Walney Extension (UK) Limited owns the WOW03 and 04 Offshore Wind Farm and associated Transmission Assets. DONG Energy Walney Extension (UK) Limited is a wholly-owned indirect subsidiary of DONG Energy A/S and holds the marine licence and consent for the WOW03 and 04 Offshore Wind Farm under the Marine and Coastal Access Act 2009 and Section 36 of the Electricity Act 1989.

An overview of the current ownership structure is illustrated in Figure 3 below.

*Figure 2. Company legal structure*



*Source: DONG Energy Legal Group Structure 31<sup>st</sup> August 2016*

### 3.3 Operation and Maintenance ("O&M")

OFTOs will have the opportunity to benefit from DONG Energy's extensive experience of operating wind farms and associated transmission assets. DONG Energy will offer to provide emergency response services which cover repair activities of export cables (off- and onshore) including fault finding, repair work and project management of all involved stakeholders. DONG Energy has invested substantial resources in developing, testing and establishing an emergency response service for rectification of OFTO asset failures in the UK. The service offering includes full access to DONG Energy's broad base of in-house experts with unique knowledge of the OFTO assets and immediate allocation of resources for repair activities.

In respect of routine O&M services, the maturity of the market has increased with a number of prudent service providers capable of providing such services. DONG Energy is willing to engage in a dialogue on certain routine O&M services, however it will focus on providing emergency response services for rectification of OFTO asset failures.

### 3.4 Transmission Assets Transferring to the OFTO

The WOW03 and 04 Transmission Assets will include two offshore substations, two offshore export cables with route lengths of approximately 80km for WOW03 to onshore transition joints, 67km for WOW04 to onshore transition joints, two onshore export cables each with a route length of approximately 4km from the onshore transition joints to an onshore substation, a further connection via two 400kV cables, with an approximate length

of 0.4km, connecting to a double busbar via one 400kV Gas Insulated Switchgear ("**GIS**") bay per circuit within the existing NGET Middleton substation, and a 220kV subsea interlink cable between the two offshore substations with an approximate length of 23km.

An overview of the assets that the Developer currently proposes to transfer to the OFTO under the project specific Sales and Purchase Agreement ("**SPA**") and which were used to derive the initial transfer value of the WOW03 and 04 Transmission Assets are set out in Table 1 below.

A simplified single line diagram for the WOW03 and 04 Transmission Assets including the boundary points are given in Appendix 1.

Table 1. Asset Summary

Asset	Description
OSSs WOW03 and WOW04	<ul style="list-style-type: none"> <li>● Structural steel topsides with five decks mounted on a jacket foundation. The overall dimensions of the substation topside will be approximately (H x W x L) 20 x 30 x 40m with an overall height of 40m above the lowest Astronomical Tide level (“LAT”) excl. crane and antenna.</li> <li>● The topside cable deck (22.5m above LAT) will be provided for array and export cable management and muster areas.</li> <li>● The main deck (28m above LAT) will be provided for the two 220/33kV transformers, together with the associated 220kV GIS, the 33kV switchgear, and the LV utility and two UPS rooms.</li> <li>● The mezzanine deck (32m above LAT) will contain the main transformer radiators, shunt reactor, auxiliary transformers and earthing resistors.</li> <li>● The OFTO control rooms, public rooms and workshops will be situated on the utility deck (36m above LAT) together with the UPS 1 room and Battery room 1.</li> <li>● A helicopter hoist area, an antenna mast and a telescopic boom crane will be provided on the roof deck (40m above LAT).</li> </ul>
220kV Onshore export cable WOW03 and WOW04	<ul style="list-style-type: none"> <li>● The two 220kV onshore export cable systems consisting of three single-core 1200mm<sup>2</sup> aluminium conductor XLPE-insulated cables installed in trefoil formation in ducts. The cable systems are installed as a balanced cross bonded system.</li> <li>● Each onshore export cable system will connect to the offshore cables at the onshore transition joints at landfall and will be installed underground in local arable land and beneath roads, consisting of 3 minor sections and 2 onshore joints.</li> <li>● The total route length of each system to the WOW03 and WOW04 substation is approximately 4km.</li> <li>● A fibre optic cable (single mode and multimode) will be routed adjacent to each of the 220kV onshore export cables. Two of the fibres will be used for DTS purposes (conductor temperature sensing).</li> </ul>
400kV Onshore to NGET cable	<ul style="list-style-type: none"> <li>● Two 400kV Onshore export cable systems to NGET Middleton substation consisting of three single core 1600mm<sup>2</sup> aluminium conductor XLPE insulated cables installed in trefoil formation with single point screen bonding and 500mm<sup>2</sup> earth continuity cables installed alongside the power cables.</li> <li>● External earthing connections 2 x 300mm<sup>2</sup> Cu isolated to connect the earth mats at WOW03, WOW04 and NG Middleton substation.</li> <li>● The 400kV export cable length is approximately 400m from WOW03 and WOW04 substation to NGET Middleton substation – installed in one length.</li> </ul>
220 kV export cable WOW03 – 04 and interlink	<ul style="list-style-type: none"> <li>● Two offshore export cable consisting of the subsea section, which will be a three-core 1200mm<sup>2</sup> Aluminium conductor XLPE single-wire armoured cable. For the final 8km at landfall the cross section will change to 1600mm<sup>2</sup></li> <li>● One three-core 500mm<sup>2</sup> Aluminium conductor XLPE single-wire armoured offshore subsea Interlink cable,</li> <li>● The total route length of the offshore export cable for WOW03 is approximately 80km, WOW04 is approximately 67km and the inter-link is approximately 23km.</li> <li>● 220kV rated, XLPE-insulated, complete with integral optical fibers.</li> </ul>
Onshore substation	<ul style="list-style-type: none"> <li>● The onshore substation will house the High Voltage (“HV”) equipment with associated reactive compensation equipment. The HV equipment is necessary for transforming the voltage level and connecting the onshore export cable to the GB NETS (at the NGET Middleton substation). The GIS will be housed in a purpose built Building (GIS Hall with ancillary rooms).</li> <li>● The main equipment proposed for transfer includes two 400/220kV transformers complete with 400 and 220kV GIS, 400kV shunt reactors, 220kV variable shunt reactors, two dynamic reactive compensation systems, 400kV and 220kV harmonic filtration equipment, UPS DC battery system.</li> </ul>

<p>NGET Middleton substation GIS</p>	<ul style="list-style-type: none"> <li>● The Middleton substation, property of NGET, is the location of the Onshore Boundary Point.</li> <li>● One 400kV GIS Breaker per export circuit, positioned within the NGET Middleton substation.</li> <li>● The GIS equipment included in the transfer will consist of a circuit breaker, line disconnecter, line earth switch and maintenance earth switch, a light current equipment room complete with associated protection and control apparatus, cable sealing ends and associated civil works.</li> </ul>
<p>SCADA</p>	<ul style="list-style-type: none"> <li>● The WOW03 and 04 Transmission Assets will be operated from a standalone segregated SCADA system that will be operated and maintained independent of the Generator SCADA System.</li> <li>● The OFTO and Generator SCADA Systems will exchange signals as required by the Grid Code.</li> <li>● The OFTO SCADA System will be connected to the National Grid Control Centre’s via the telecoms and data interface at the NGET Middleton 400kV Substation and will deliver the signals required from the HV systems of the WOW03 and 04 Transmission Assets and the WOW 03 and 04 Offshore Wind Farms.</li> <li>● The OSSs and the onshore substation (“<b>ONSS</b>”) will have separate OFTO and Generator SCADA System equipment rooms.</li> </ul>
<p>Spares</p>	<ul style="list-style-type: none"> <li>● Later in the process, the Developer will discuss the possibilities for cooperation regarding spare parts with the preferred bidder for the WOW03 and 04 Transmission Assets.</li> </ul>

### 3.5 Ownership Boundaries

Detail of the current offshore and onshore boundary points proposed by the Developer which have been used for the purposes of calculating the Initial Transfer Value as described in Table 2, and the section below.

*Table 2 . Proposed boundary points offshore and onshore*

Location	Boundary Point
Offshore WOW03 OSS	Located at the sealing ends of the 34kV cable terminating at the 34kV MV switchgear connecting from the grid transformers on the OSS.
Offshore WOW04 OSS	Located at the sealing ends of the 34kV cable terminating at the 34kV MV switchgear connecting from the grid transformers on the OSS.
Onshore	Located in the first gas barrier zones of both main and reserve 400kV busbar contained within the existing NGET Middleton 400kV substation.

### 3.6 Consents

The Developer has the key project consents in place to construct the WOW03 and 04 Offshore Wind Farm including the WOW03 and 04 Transmission Assets. The Developer has entered into almost all required crossing and proximity agreements for the export cable routes and the interlink cable route.

The Developer and the preferred bidder for the WOW03 and 04 Transmission Assets will have to agree on provisions relating to the assumption by the OFTO of responsibility for

the performance of, and compliance with, certain consent conditions, and these will be detailed in the SPA relating to the WOW03 and 04 Transmission Assets.

### 3.7 Risk Mitigation

The WOW03 and 04 Transmission Assets have been designed in accordance with the planning criteria as defined in the NETS SQSS.

The WOW03 and 04 Transmission Assets have been designed to ensure that the capacity of the WOW03 and 04 Offshore Wind Farm that can be transferred during a planned or unplanned outage is compliant with Chapter 7 of the NGET SQSS, with the exception of the onshore substation, which has a design variation accepted by NGET (7<sup>th</sup> April 2015) where a single 220kV busbar design has been applied. The onshore and offshore transformers have been designed and rated to approximately 66% and 60% of the wind farm installed capacity (330MW each). Should a fault occur in one of these devices, the WOW03 and 04 Offshore Wind Farm will not have to be shut down by default. However, the export capacity may under certain outage conditions, be constrained. The extent of the power reduction will depend on the prevailing wind speeds and generator availability.

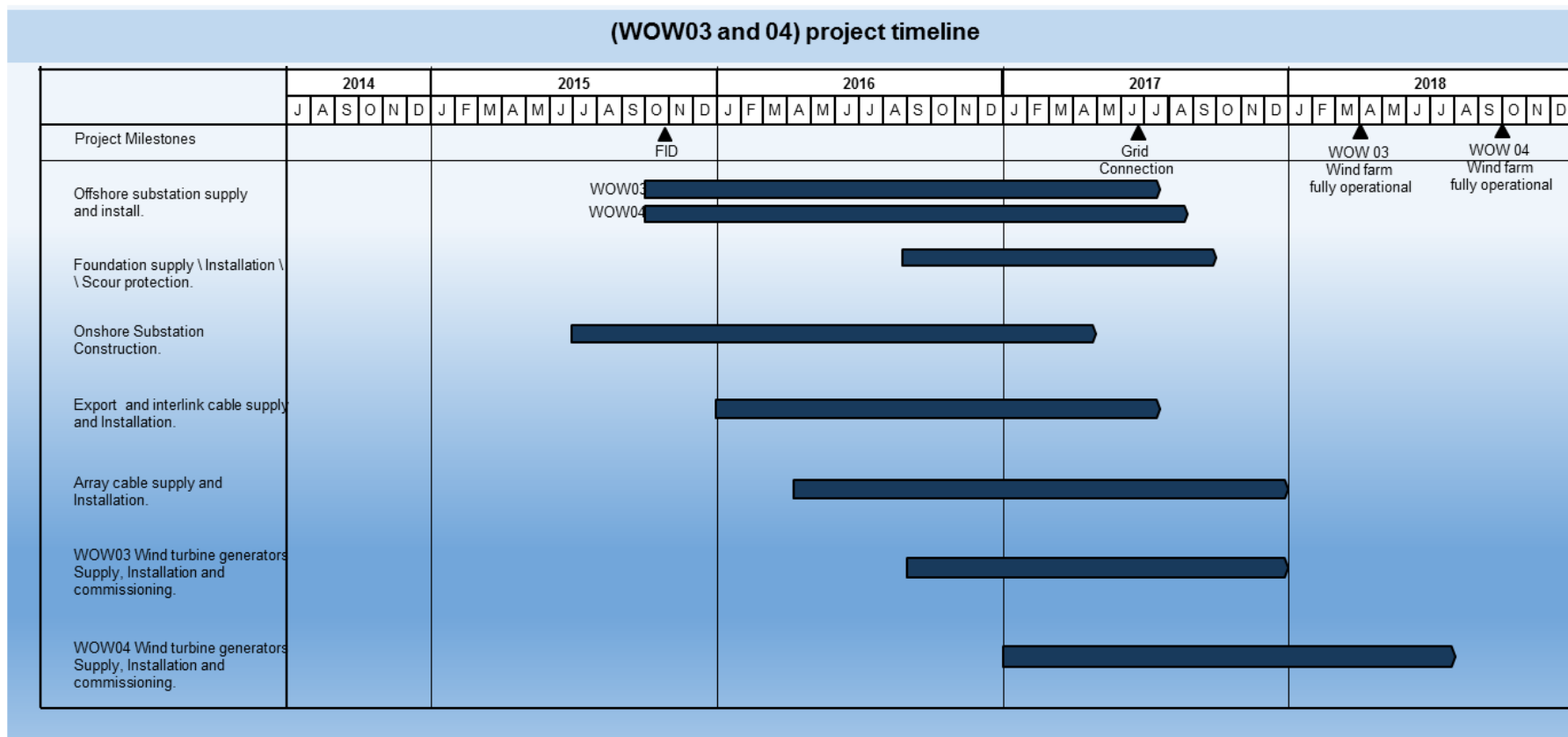
A 220kV interlink between the two offshore substations has been designed to provide export capacity during an export cable or onshore 220kV busbar outage. Normally the interlink is de-energised. Following an export cable or onshore busbar outage the interlink can be switched into service to allow export from both WOW03 and WOW04. In this scenario both windfarms must be curtailed to 50% to limit the power production to the rating of the remaining export cable.

### 3.8 Project Timeline

Design of the WOW03 and 04 Offshore Wind Farm commenced in 2013, and construction work on the WOW03 and 04 Transmission Assets started in Q3 2015. Construction and commissioning of the WOW03 and 04 Transmission Assets are both expected to be complete by Q3 2017. The commissioning of the WOW03 and 04 Offshore Wind Farm is expected to be completed by Q3 2018. Please see figure 3.

Figure 2 – Project Timeline

# Walney Extension



Source: DONG Energy June 2016

### 3.9 Network Design Features

Table 3 summarises the key transmission network design features of the WOW03 and 04 Transmission Assets:

**Table 3 - Summary of WOW03 and 04 system design features**

<b>Key features:</b>	
Expected designated service life	25 years
Composite export circuit capacity WOW 03	345MVA
Composite export circuit capacity WOW 04	345MVA
Composite export circuit capacity Interlink	220MVA
Expected minimum annual design availability	98% (taking into account both planned and unplanned maintenance)
Technical compliance with industry codes and standards	System compliant with requirements - "Codes and standards" section refers.

A Connection and Use of System Agreement ("**CUSA**") has been entered into between the developer and NGET with Transmission Entry Capacity ("**TEC**")<sup>7</sup> export rights of 330MW at the OSS for WOW03 and 330MW at the OSS for WOW04.

<sup>7</sup> Transmission Entry Capacity (TEC) is a CUSC term that defines a generator's maximum allowed export capacity onto the transmission system.

#### 4. Commercial and Contractual Arrangements

Contracting and procurement for the WOW03 and 04 Transmission Assets has been carried out on a multi-contract basis. The Developer has managed a comprehensive and robust pre-qualification, tender and contracting process. The contracts associated with the transmission assets are set out in Table 4 below.

**Table 4 - Contractors for the transfer of the WOW03 and 04 transmission assets**

Services and main equipment list	Contract and contractor
<p><b>OSS - construction:</b></p> <p>Five-story steel topside module mounted on a jacket foundation.</p>	<p>Supply: Joint Venture Fabricom/Iemans, JVFI Belgium</p> <p>Installation: Seaway Heavy Lifting Contracting BV Limited</p>
<p><b>OSSs – mechanical and electrical equipment:</b></p> <ol style="list-style-type: none"> <li>8 x 220kV GIS Switchgear for WOW03 and WOW04 incl. tee-off for HV Shunt reactors</li> <li>4 x 220/36kV 200 MVA Power transformers for WOW03 and WOW04</li> <li>2 x 34/0.4kV 500KVA Earthing Auxiliary Transformers for WOW03 and WOW04</li> <li>4 x 20kV, 20Ω, 1000A, 5s Neutral Earthing Resistors for WOW03 and WOW04</li> <li>2 x 220kV Shunt reactors 90 MVAR</li> <li>2 x Diesel generators</li> <li>2 x Low Voltage switchgear</li> <li>2 x UPS AC battery systems</li> <li>2 x UPS DC battery systems</li> </ol>	<ol style="list-style-type: none"> <li>Supply and installation: Siemens A/S</li> <li>Supply and installation: ABB A/S</li> <li>Supply and installation: Kolektor Etra – JVFI</li> <li>Supply and Installation: Hilkar Elektrik Elektrotechnik -- JVFI</li> <li>Supply and installation: Royal SMIT Supply and Installation: JVFI</li> <li>Supply and Installation: JVFI</li> <li>Supply and Installation: JVFI</li> <li>Supply and Installation: JVFI</li> <li>Supply and Installation: JVFI</li> </ol>
<p><b>Offshore export cables :</b></p> <ol style="list-style-type: none"> <li>1 x WOW03 – 80km 220kV 3C 1200mm<sup>2</sup> Alu XLPE galvanized SWA C\W 2 x 48 single fibers</li> <li>1 x WOW04 – 67km 220kV 3C 1200mm<sup>2</sup> Alu XLPE galvanized SWA C\W 48 single fibers</li> <li>1 x Interlink – 23km 220kV 3C 500mm<sup>2</sup> Alu XLPE galvanized SWA C\W 48 single fibers</li> </ol>	<p>1 to 3 Supply and termination: ABB SE</p> <p>Installation: Deep Ocean Limited</p>
<p><b>Onshore export cables:</b></p> <ol style="list-style-type: none"> <li>2 x 4km 220kV 3C 1200mm<sup>2</sup> Aluminium XLPE</li> <li>2 x 400m 400kV 3C 1600mm<sup>2</sup> Aluminium XLPE</li> <li>2 x Fiber optic cable: – 2 x 48 single fibers</li> </ol>	<ol style="list-style-type: none"> <li>220kV Supply &amp; termination ABB AB. HV Cables</li> <li>400kV Supply and termination: NKT Cables A/S</li> <li>Supply:&amp; termination: ABB AB. HV Cables</li> </ol> <p>Installation (HV and FO): J.Murphy's and Son</p>



	Ltd
<b>Onshore substation:</b> <ol style="list-style-type: none"> <li>1. Civils construction</li> <li>2. 1 x 220kV GIS</li> <li>3. 2 x 400/220/470MVA auto transformers</li> <li>4. 2 x 220kV shunt reactor 115 – 250MVar</li> <li>5. 2 x 400kV shunt reactor 62MVar</li> <li>6. 2 x 220kV harmonic filter (100MVar)</li> <li>7. 2 x 400kV harmonic filter (60MVar)</li> <li>8. 2 x 140MVar SVC and auxiliary transformers</li> <li>9. 2 x 400kV AIS Equipment</li> </ol>	<ol style="list-style-type: none"> <li>1. Supply and installation: Amey Utility Services Limited</li> <li>2. Supply and installation: Siemens A/S</li> <li>3. Supply and installation: ABB A/S</li> <li>4. Supply and installation: Siemens AG.</li> <li>5. Supply and installation: Royal SMIT BV</li> <li>6. Supply and installation: Siemens UK T&amp;D Ltd</li> <li>7. Supply and installation: Siemens UK T&amp;D Ltd</li> <li>8. Supply and installation: Siemens A/S</li> <li>9. Supply and Installation: Mitsubishi Electric Europe B.V</li> </ol>
<b>Middleton NGET substation:</b> <p>2 x Bay 400kV GIS switchgear</p>	Supply and installation: NGET PLC via ABB UK
<b>SCADA:</b> <ol style="list-style-type: none"> <li>1. SCS OFTO station control and protection system comprising 10 x Servers and 21 x RTU 's Controllers</li> <li>2. 10 x DSM recorders</li> </ol>	<ol style="list-style-type: none"> <li>1. Supply, install, commission: Alstom Grid UK Ltd</li> <li>2. Supply, install, commission: Siemens PLC</li> </ol>

## 5 Disclaimer and Notices

### 5.1 Non-reliance, Accuracy of Information and Exclusion of Liability

5.1.1 It is the responsibility of each bidder to ensure that it has all of the information it needs to prepare its submissions.

5.1.2 While information provided by Ofgem and/or its advisers in this PIM or otherwise in relation to the Tender Round has been prepared in good faith, neither Ofgem nor any of its advisers make any representation or warranty (express or implied) in relation to the Tender Round or any information provided by developers through data rooms or otherwise. Ofgem and its advisers expressly disclaim any and all liability (other than in respect of fraudulent misrepresentation) based on or relating to any such information or representations or warranties (express or implied) contained in, or errors or omissions from, the PIM or based on or relating to its use by a bidder, a developer and/or any other interested party.

#### Use of Information

5.1.3 This PIM is not intended to provide the basis of any investment decision, nor is it intended to be considered as an investment recommendation by Ofgem or by any of its advisers. Each bidder, developer and any other interested party must make its own independent assessment of the qualifying project(s) after making such investigation and taking such professional advice as it deems necessary.

5.1.4 The material in the PIM is not and should not be regarded as legal or professional advice. Bidders, developers and other interested parties should seek their own legal or other professional advice where appropriate.

5.1.5 Nothing in the PIM is intended to, or shall be deemed to establish any partnership or joint venture between Ofgem and any bidder or any developer.

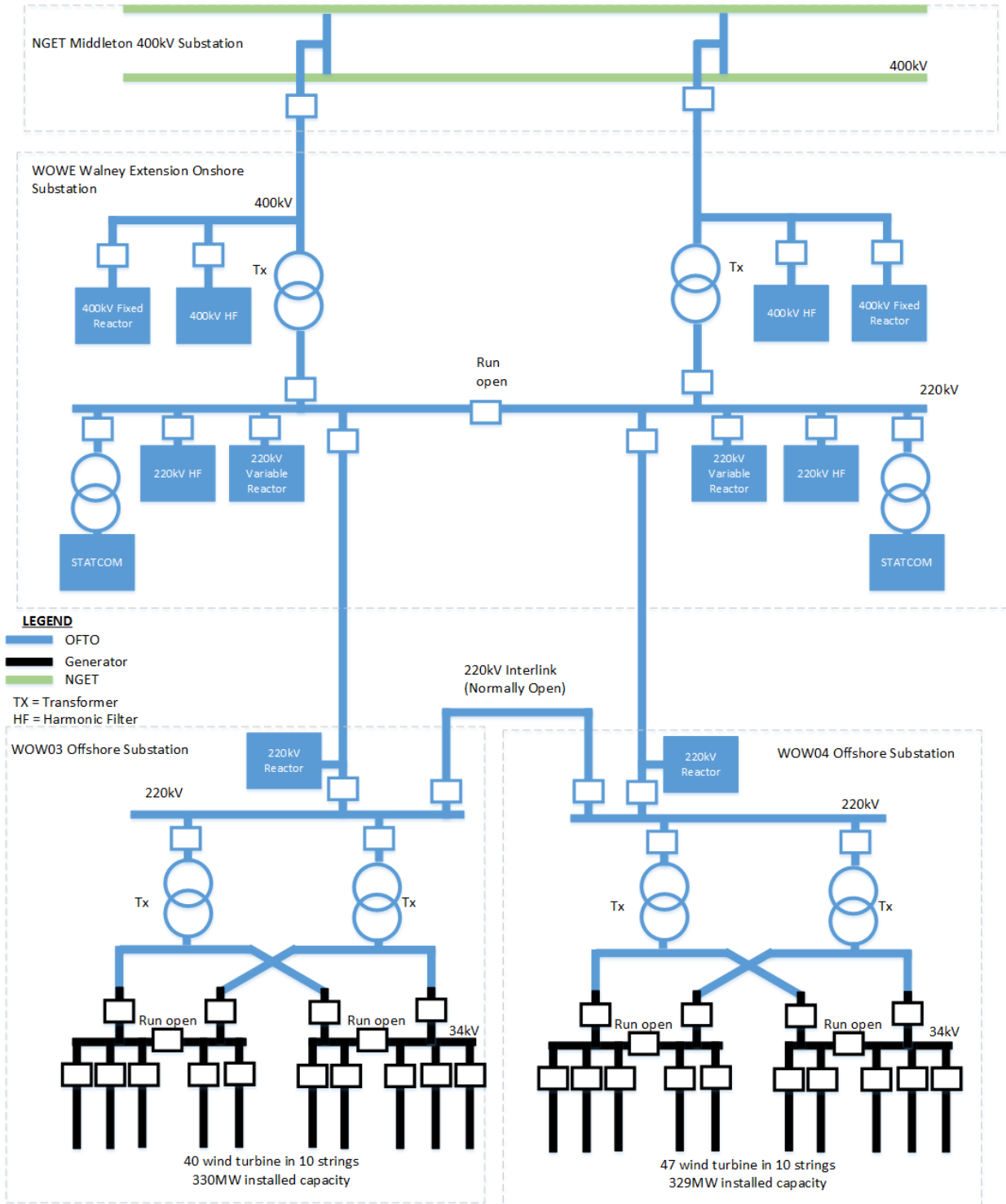
5.1.6 Advisers acting for Ofgem in relation to the Tender Round will not regard any developer or bidder or other interested party as their client or be responsible to anyone other than Ofgem for providing the protections afforded to their clients or for advising any other person on the Tender Round or any matter related to it.

## 6. Contact Details

The information in this document is provided for information purposes only. It is designed to provide prospective OFTOs, lenders and advisers with certain high-level information related to the WOW03 and WOW04 Transmission Assets, to support the launch of the initial, pre-qualification phase of the tender process. All enquiries or communications, including requests for additional information, should be sent to [tendercoordinator@ofgem.gov.uk](mailto:tendercoordinator@ofgem.gov.uk).

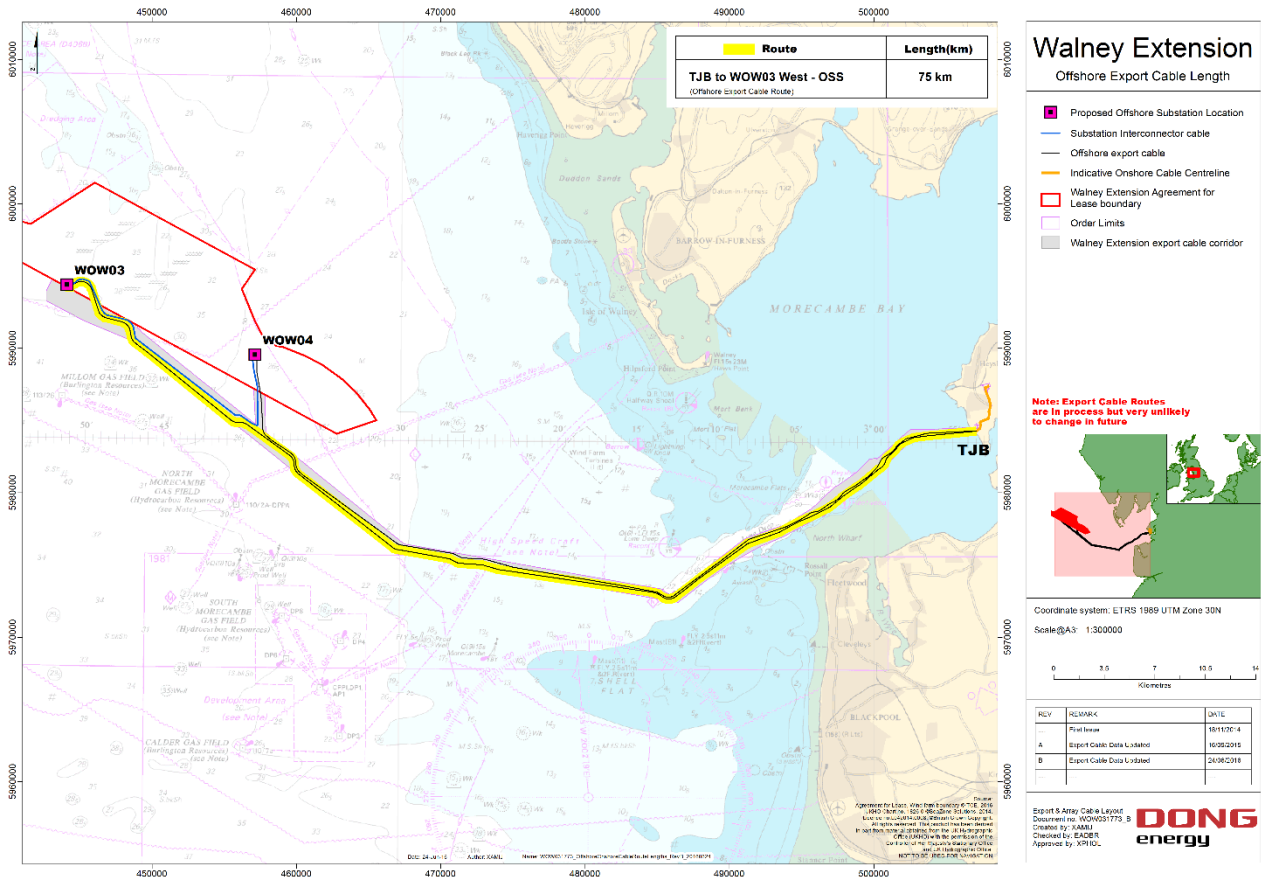
## 7. Appendices

### Appendix 1 - Simplified Single Line Diagram



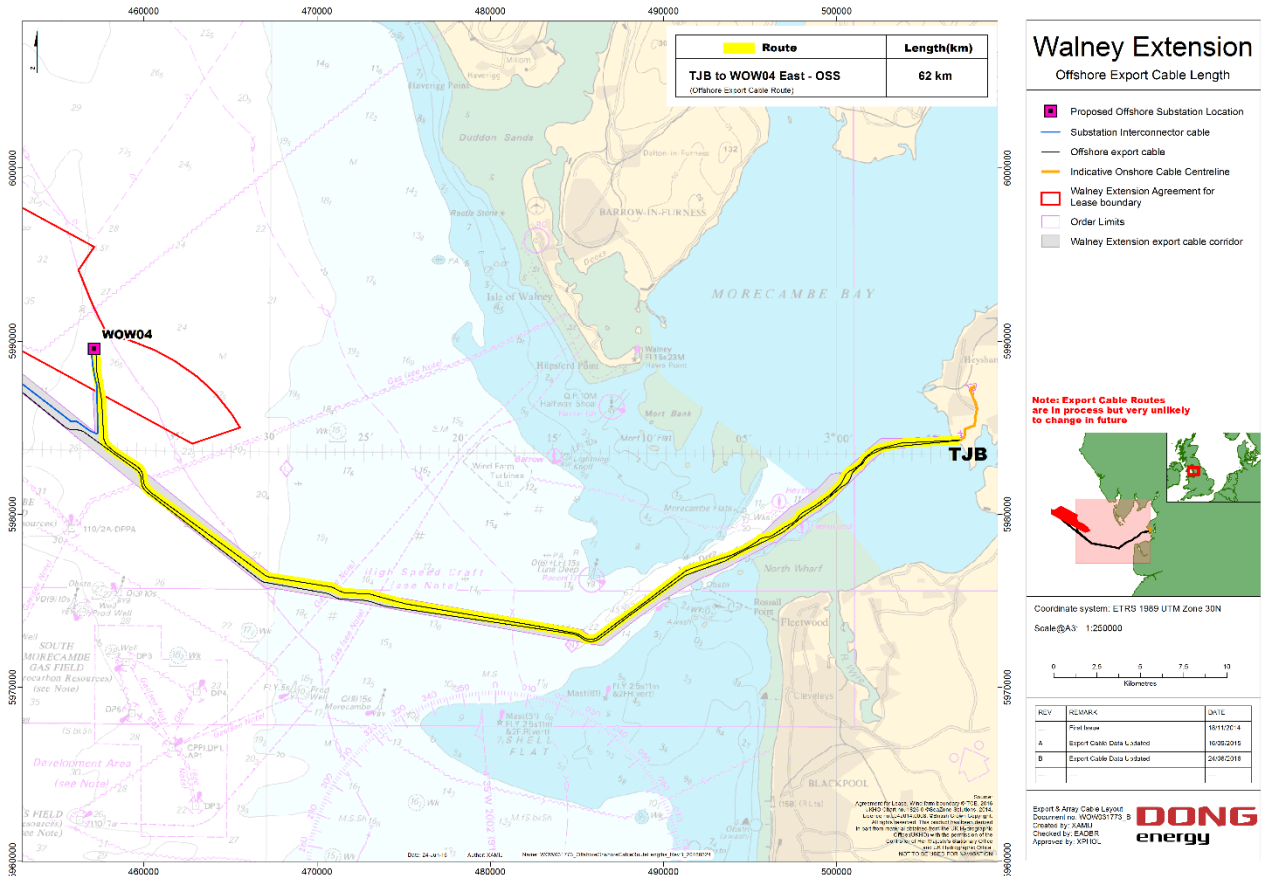
Source: DONG Energy June 2016

Appendix 2 - Location Map and WOW03 Export cable route



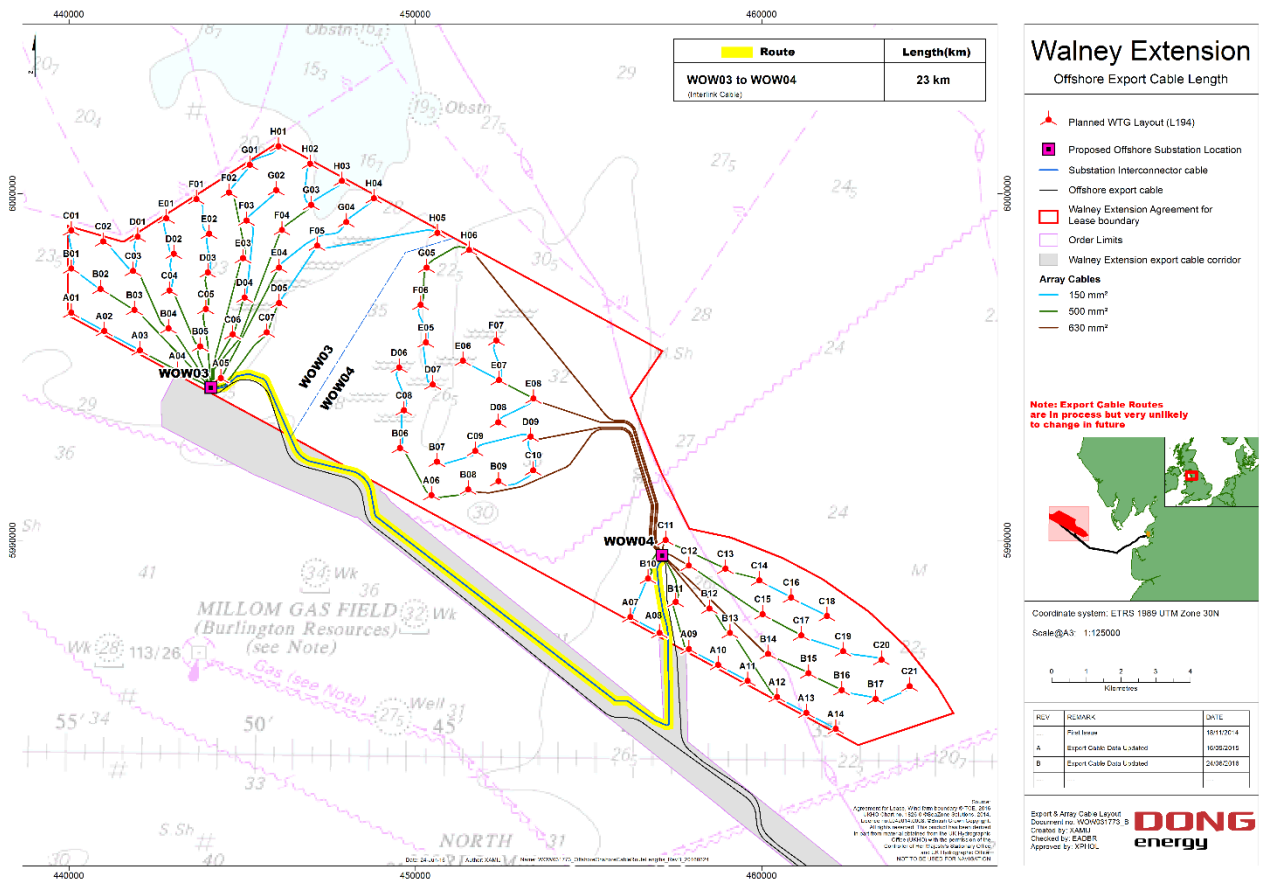
Source: DONG Energy June 2016

Appendix 3 – WOW04 Export Cable Route



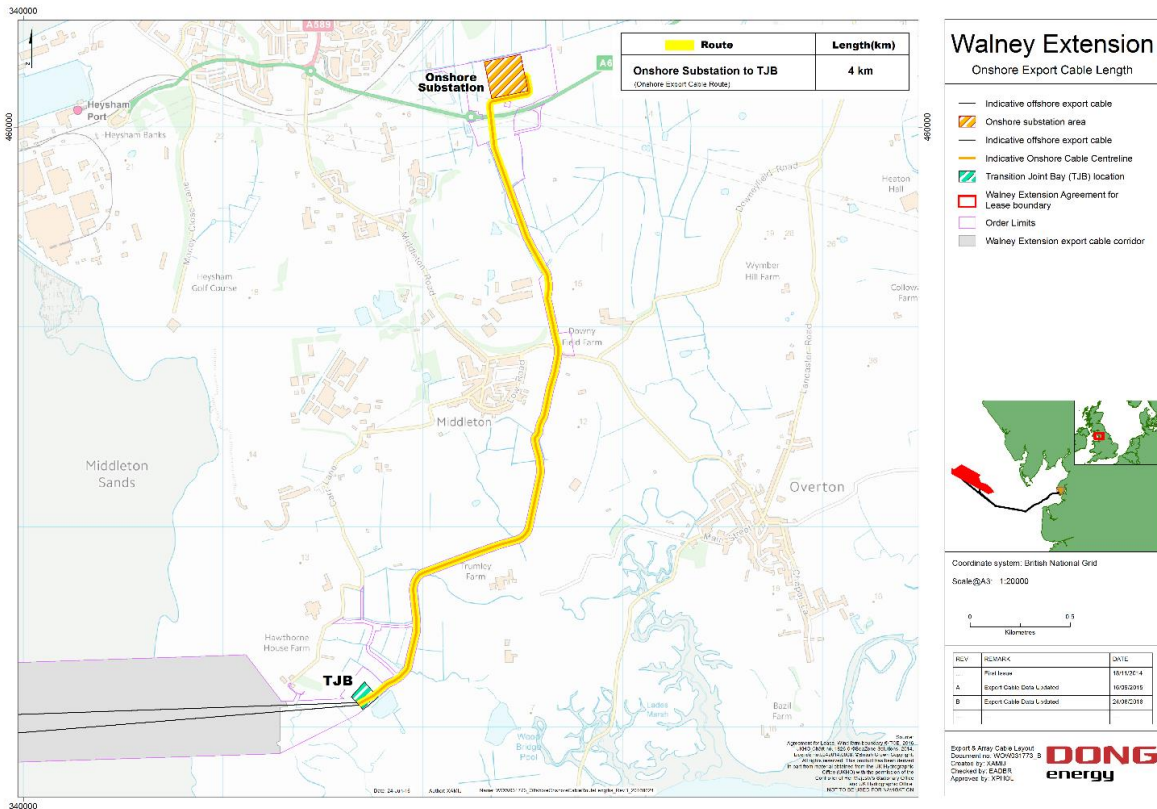
Source: DONG Energy June 2016

Appendix 4 - WOW03 and 04 Interlink Cable Route



Source: DONG Energy June 2016

Appendix 5 - Onshore Export Cable Route



Source: DONG Energy June 2016

Appendix 6 – WOW03 and 04 Onshore Substation ONSS Location



Source: DONG Energy June 2016